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CONTRIBUTIONS TO THE JAPANESE ASCIDIAN FAUNA XXVI. NOTES ON SIMPLE ASCIDIANS COMMONLY FOUND IN THE WATERS NEAR THE SABIURA MARINE PARK RESEARCH LABORATORY

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With Text-figures 1–2

A small material of simple ascidians common in the vicinity of the Sabiura Marine Park Research Laboratory in February 1973 was submitted to the second author for identification. In addition, this author observed several individuals of a form of *Ascidia* on November 16, 1972 in some tanks of the aquarium of the Kushimoto Marine Park Center. They were all coloured uniformly light yellow throughout the body and always attached to the very protected site of rocks or dead corals, therefore it had been impossible to remove any of them from the substratum. Later, in February 1973 they succeeded to remove a specimen from the reef coral in an aquarium tank and submitted it to the author for examination. All these specimens were examined by both authors and the last one was found to represent a new species. Thus in all, the present material includes fifteen specimens of the following six species.

1. *Ascidia citrina* n. sp. 1 specimen
2. *Ascidia sydneiensis samea* (Oka) 5 specimens
3. *Rhodosoma turcicum* (Savigny) 1 specimen
4. *Polycarpa cryptocarpa* var. *kroboja* (Oka) 2 specimens
5. *Styela esther* Hartmeyer 3 specimens
6. *Herdmania momus* (Savigny) 3 specimens

Before going into the description, the authors wish to express their hearty thanks to the staff, especially to Dr. K. Hayashi, of the Sabiura Marine Park Research Laboratory for their kindness in submitting the specimens to the authors.

Ascidia citrina n. sp.

(Fig. 1)

The live specimens seemed up to 50 mm in length, excluding the branchial siphon, oval to elliptical in outline, and 30 mm in width. The single preserved

1) Contributions from the Seto Marine Biological Laboratory, No. 603.

specimen is 45 mm long and about 30 mm wide. The animals are all attached to the substratum by their whole left side. The branchial siphon is terminal, while the atrial is issued from the middle of the dorsal side or situated with the posterior edge of its base at the middle; both siphons are rather prominent, though contracted on the preserved specimen. The branchial aperture is 8 (Fig. 1c) to 12-lobed (Fig. 1

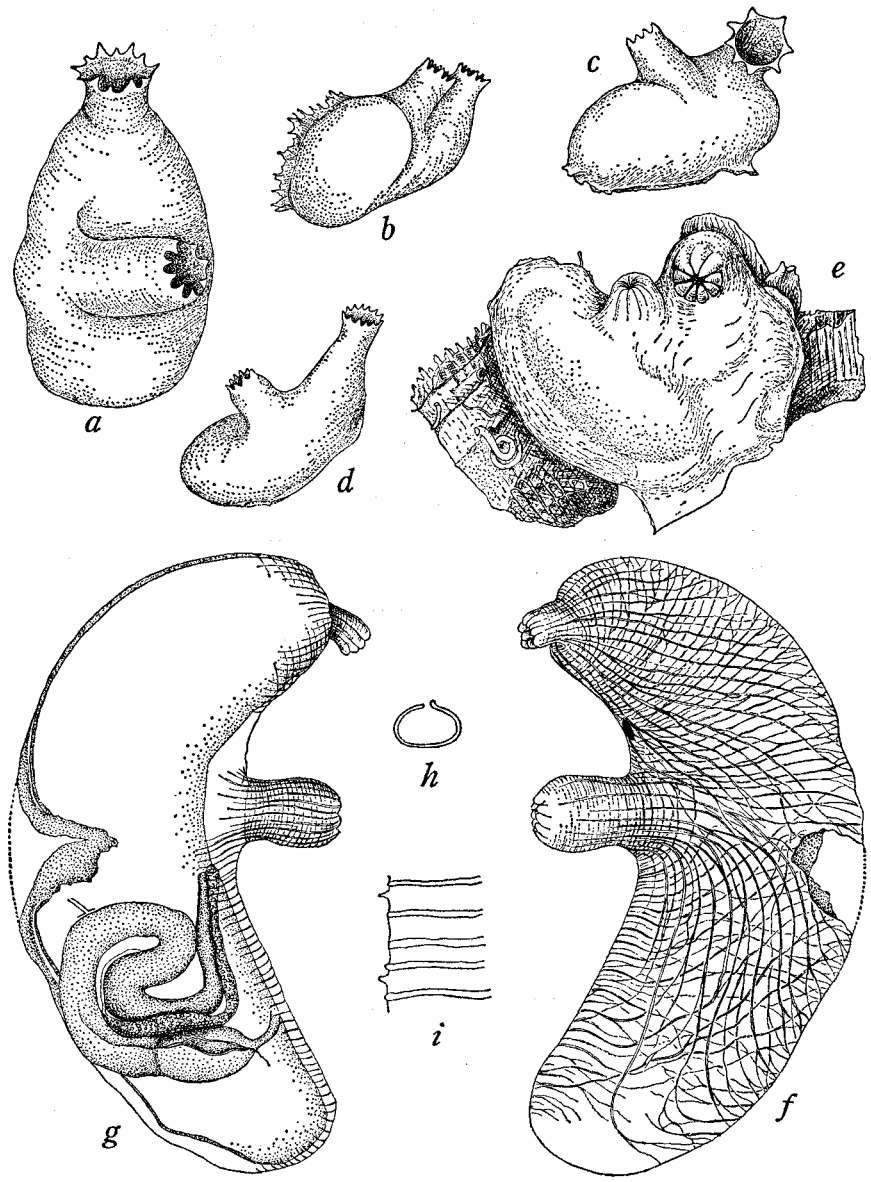

Fig. 1. *Ascidia citrina* n. sp. a–d: features of four living specimens. e–i: type specimen preserved in formalin. e: whole animal. f: right side of mantle body. g: left side of mantle body. h: ciliated groove. i: dorsal lamina, middle part.

a, d), in the latter case larger and smaller lobes are alternating; the atrial lobes are 8 or more when some smaller intermediate lobules are inserted. In the preserved specimen, both apertures are seemingly 9–lobed. The body surface is smooth and quite free from any foreign matter. The test is of a moderate thickness and hardness, translucent, and lemon yellow when alive; the bigger the specimens are, the lighter is this colouration. The orange stomach is seen very faintly through the test in live specimens. Only the preserved specimen was dissected.

The mantle body is rather elongate, the branchial siphon terminal and the atrial with its posterior base at the middle of the dorsal side. Both siphons are not long, but very distinct. The whole right side is reticulated with fine muscles. The dorsal ganglion is situated a little posterior to the middle of the distance between both siphons. The anterior edge of the intestinal loop reaches nearly the level of the posterior base of the atrial siphon. The branchial sac extends posteriorly far beyond the posterior margin of the oval stomach, the oesophagus opens to the branchial sac a little behind the middle of the body half posterior to the atrial siphon. The first intestinal loop is greatly bent dorsads and the axis of the second intestinal loop passes across the intestine far behind the pyloric end of the stomach. The whole visceral mass seems thus comparatively small. The gonad is seemingly matured.

Tentacles are about 30, inclusive of larger, smaller and fine ones which are arranged as—large fine small fine large—. Further, a very fine papilla is found in every interval between these. The prebranchial area is not papillated. The ciliated groove is very small and simply C-shaped, opening anteriorly. The dorsal lamina is strongly ribbed. It is very low and with the smooth margin in the anterior part, but in the middle the tip of respective ribs is protruded out slightly to form a fine projection on the lamina margin that is furnished with a fine projection at some intervals between the ribbs. In further posterior part, the lamina diminishes the height and near the oesophageal opening it becomes lastly to be a series of fine projections. In the present 40 mm long mantle body, there are 190 transverse vessels, including thicker and thinner ones alternating regularly. The longitudinal vessels are 48 on the left and 54 on the right side in the middle part of the branchial sac. Papillae on vessels are relatively small, intermediate papillae absent, no plications definable, and 5 or 6 stigmata in respective meshes.

Remarks: In all nine live specimens were observed, but the internal structure were examined in only a single preserved specimen, that is deposited at the Seto Marine Biological Laboratory as the type. So far the new species has been found only in the district of Kusimoto near the Cape Siono-misaki, the southern-most tip of Honsyu Island, Japan, attached mainly to dead reef corals.

The oval and translucent body with the atrial siphon issued from around the middle of the dorsal side, with the surface quite smooth and free from any foreign materials, and coloured uniformly lemon yellow must be characteristic when alive, but this cannot be effectual in the preserved state.

On the mantle body, the distinct atrial siphon issued from around the middle of the body, the muscular reticulation covering the whole right side, and the situation

and feature of the visceral mass on the left side may be the most remarkable characters; the visceral mass is relatively small, with the anterior edge approximately at the level of the base of the atrial siphon and the posterior part of the branchial sac far extended behind the rear edge of the visceral mass, and the first intestinal loop is bent markedly dorsads.

Of the species of the genus *Ascidia* occurring in the Japanese waters and the tropical to subtropical waters of the northwestern Pacific, *A. kreagra* Sluiter, 1895, *A. austera* Sluiter, 1904, *A. liberata* Sluiter, 1880 and *A. melanostoma* Sluiter, 1885, all from the Malay Archipelagoes, resemble the present new species in having the smooth test, muscular reticulation wholly covering the right side of the mantle body and the alimentary canal with the first intestinal loop bent as markedly as in the present new species. However, in all of them, the visceral mass occupies the whole posterior part of the left side of the mantle body and no remarkable extension of the branchial sac is definable behind the visceral mass. Further, in *kreagra* and *liberata* the anterior margin of the visceral mass attains more anteriorly over the level of the base of the atrial siphon and in *austera* and *melanostoma* the prebranchial area is papillated. In *liberata* the ciliated groove is cut into pieces, and in *austera* and *melanostoma* some parts of the body are coloured dark. *A. gemmata* Sluiter, 1895 is noted by having the posterior extension of the branchial sac behind the visceral mass, but in this species the anterior margin of the visceral mass reaches far anteriorly beyond the level of the base of the atrial siphon and the prebranchial area is clearly papillated.

A. gamma Tokioka, 1964 that was established on a single 21 mm long specimen obtained from Osaka Bay, is characterized by the structure of the visceral mass, in which the first intestinal loop is bent strongly dorsads. In this species the branchial sac is extended out considerably behind the visceral mass, but the anterior edge of the mass attains the middle of the distance between both siphons. Smaller numbers of longitudinal and transverse vessels on the branchial sac in this species, especially the former, have been confirmed in the second 45 mm long specimen collected from Matusima Bay. The sessile feature of apertures on the surface of the smooth test is probably caused by strong contraction. Therefore, at present, the relative situation of the visceral mass and the number of longitudinal vessels on the branchial sac may be the clues to separate the new species from *gamma* in the preserved state; behind the level of the atrial siphon in the former, while with the level of the atrial siphon at the middle of the mass in the latter as to the relative situation of the visceral mass, and significantly fewer in the latter as to the number of longitudinal vessels. Anyhow, if the colouration of live *gamma* were noted, the identification of the present specimen would be done much more easily.

Ascidia sydneiensis samea (Oka, 1935)

(Fig. 2)

The body size and numbers of vessels of the branchial sac in five specimens are

given below.

Specimen no.	Mantle body, excl. siphons	Longitudinal vessels	Transverse vessels
1	44 mm (l) ×25 mm (w)	(l) 43, 49 (r)	145
2	33 ×18	42, 43	114
3	33 ×15	37, 39	113
4	32 ×19	38, 42	100
5	27 ×13	42, 45	120

The test is whitish and translucent; the surface itself is quite smooth but sparsely projected out into stout prominences except in the specimen No. 5 that is furnished with only a few of them. The anterior margin of the visceral mass never reaches beyond the level of the anterior base of the atrial siphon. The axis of the deep second intestinal loop passes across the pyloric end to the middle (specimen No. 2) of the stomach. The ciliated groove is complicated as seen in Fig. 2. The gonads are wholly emptied in specimens Nos. 2, 4 and 5, but in specimen No. 1 the vas deferens contains yellowish white sperms, and in specimen No. 3 yellowish-brown eggs and pinkish white sperms are seen in the oviduct and vas deferens.

Fig. 2. *Ascidia sydneiensis samea* (Oka). Ciliated grooves of five specimens from 27 to 44 mm long.

Rhodosoma turcicum (Savigny, 1816)

Only a single specimen, 45 mm long and 25 mm wide, in the material. Clusters of yellowish orange eggs are densely distributed all over the free surface of the intestinal loop, though no testicular follicles are seen.

Polycarpa cryptocarpa var. *kroboja* (Oka, 1906)

Two specimens in the material; the larger is 47 mm long and 34 mm wide, while the smaller is 40 mm long and 35 mm wide. The ciliated groove is simple in both specimens; oblong antero-posteriorly in the larger, but nearly circular in the smaller. In the smaller specimen, an additional incomplete dorsal branchial fold is seen in the posterior region on the right side. Inner longitudinal vessels are arranged as follows:

Left D. 4 (10) 6 (12) 7 (12) 7 (10) 4 V.
Right D. 0 (4) 1 (10) 7 (12) 6 (13) 6 (11) 5 V.

Three endocarps are filling the first intestinal loop. In both specimens, gonads are emptied, only numerous genital apertures being seen.

Styela esther Hartmeyer, 1906

Three specimens in the material, respectively 26 mm long and 23 mm wide (sp. No. 1), 20 mm long and 13 mm wide (sp. No. 2), and 20 mm long and 27 mm wide (sp. No. 3). The ciliated groove is simply circular (Nos. 1 and 2) or with one horn stretched anteriorly (sp. No. 3). The branchial formulae are as follows:

No. 1 specimen	Left	D.	9	(10)	6	(13)	6	(12)	5	(10)	3 V.
	Right	D.	7	(9)	6	(14)	5	(15)	4	(12)	5 V.
No. 2 specimen	Left	D.	8	(11)	8	(14)	5	(15)	5	(11)	4 V.
	Right	D.	1	(14)	8	(14)	6	(14)	6	(12)	6 V.
No. 3 specimen	Left	D.	5	(12)	5	(14)	7	(12)	7	(9)	7 V.
	Right	D.	5	(12)	4	(13)	8	(11)	7	(10)	7 V.

The visceral mass occupies the posterior half or one-third of the body; the second intestinal loop is very shallow. A large endocarp is located in the deep first intestinal loop. The anal margin is smooth.

Two gonads on each side in specimens Nos. 1 and 2, with the left posterior one situated along the distal branch of the intestinal loop, and parallel to the anterior one. In the specimen No. 3, however, the gonads are wholly missing on the left side. All gonads are nearly emptied. Ten to sixteen male genital apertures open respectively at the end of short vasa deferentia scattered on the free surface of each gonad; they are arranged roughly in a series in most gonads.

Herdmania momus (Savigny, 1816)

Three specimens in the material, respectively 36 mm long and 28 mm wide (sp. No. 1), 29 mm long and 28 mm wide (sp. No. 2), and 32 mm long and 22 mm wide (sp. No. 3). Generally nine branchial folds are seen but on the left side of the specimen No. 3, in which 8 folds are defined. The ninth (ventral-most) fold tends to diminish the height as seen in the specimen No. 1, on the left side of the specimen No. 2 and on the right side of the specimen No. 3, where it is disappeared completely in the posterior portion.

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